ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XI. FEBRUARY, 1900. NO. 2.

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Some New Genera and Species of N. A. Tineina.

By W. G. DIETZ, M.D.

Believing that the genera and species here described are new to science, I offer the following as a small contribution to our knowledge of N. A. *Tineina:*

Eucordylea gen. n. fam. Gelechidæ.—Labial palpi strongly developed, robust; first joint porrect; second erect, with a dense brush of stiff hair the entire length of its upper surface, capable of being extended in a line with the first joint, and a lateral, fanlike spreading out of the brush; third joint shorter than the second, sharply pointed. Head about as wide as long, face perpendicular, smooth-scaled; occiput somewhat rough scaled. Eyes prominent, round; tongue wanting; no maxillary palpi; antennæ rather stout, simple, joints close set, scarcely more than two-thirds the length of the anterior wings. Thorax and abdomen moderately slender. Posterior tibiæ with long, appressed stiff hair along their upper margin; middle pair of spurs at two-fifths from the apex, inner spur more than twice the length of outer one. Anterior wings elongate, dull pointed, nearly five times as long as wide, margins nearly straight from near the base to the apical fifth, then equally narrower from both margins to the apex. Neuration: costal to margin before the middle, cell closed, pointed posteriorly, vein 7 and 8 stemmed, 7 to costa. Hind wings rhomboidal, anterior and inner margins straight parallel, apex slightly

produced, posterior margin oblique, feebly bisinuate. A pencil of stiff hair arises between the insertion of the wing and the anal angle. Cilia twice the width of the wing. Neuration; cell closed; vein 2 arises remotely from hind angle of cell, veins 3–5 closely together from the latter.

While alive and at rest, the extended palpi, with its dense brush of stiff, bristly hair spread out laterally, give the insect a very peculiar, bearded appearance. The statements as to the neuration given above are such as are discernable without denudation; the single specimen in my possession does not warrant such proceedure. Careful examinations with high power fails to reveal the presence of a tongue.

E. atrupictella n. sp. (Plate I, fig. 1, 1*a*).—Pale creamy yellow. Palpi; outer surface of first joint, a transverse line about the middle and a broader band at the apex of the second joint and both of which extend across the brush of bristly hair; an annulus at the middle and another at the apex, not including the extreme tip of the third joint, blackish. Antennæ annulate with fuscous. Anterior wings with blackish markings as follows: extreme costa, from base to one-fifth its length, an oblique fascia beginning at one-fifth from the costa and reaching the dorsal margin at one-third, less distinct at the latter, bisinuate externally and shading off gradually to the ground color at the base; a broad and less oblique fascia before the middle, narrowed toward and not attaining the dorsal margin; bisinuate toward the base; a third fascia, narrower than the last, at a little less than two-thirds the length, slightly oblique, becoming narrower toward the dorsal margin without attaining it; this fascia is further removed from the base at its costal than at the dorsal extremity; a long stripe in the middle of the wing extends from the second fascia through the third and a trifle beyond; five larger and several very small and indistinct spots around the apex. Underside of wing, corresponding to the dark markings of the upper surface, but more diffused, dark fuscous. Cilia at apex dusted with dark fuscous scales. Hind wings pale cinereous, cilia concolorous, pale stramineous toward their base. Anterior legs annulate and spotted with dark fuscous; middle and posterior femora, with broad, irregular fuscous band before the apex, latter tipped with fuscous; middle tibiæ fuscous externally, posterior with a few scattered spots of fuscous scales, tarsi annulate with dark fuscous. Length of anterior wing 5.0 mm.; exp. 12.0 mm.; 0.48 inches.

Hab.—Hazleton, Pa. A single ♂ specimen taken August 4th, 1899.

Nealyda gen. n. fam. Elachistidæ.—Head transverse, moderately convex; face somewhat receding beneath; ocelli present; tongue strong

scaly at its base. Labial palpi of moderate length, curved, ascending rather remotely from the face, cylindrical, close scaled, apex not attaining the level of the antennal insertion, second joint somewhat thickened toward the apex, longer than the pointed, third joint. Maxillary palpi rudimentary. Eyes round, moderately convex, visible from the front. Antennæ slender, scarcely three-fourths the length of anterior wings, basal point very little wider than the stalk, less than twice as long as wide, the latter finely denticulate beneath. Thorax robust, convex. Abdomen rather short, in the male with small anal tuft and lateral claspers. Posterior tibiæ smooth, inner spur of middle pair twice the length of the outer and slightly thickened toward the apex. Anterior wings oblong lanceolate, costa evenly curved from the base. All veins present, cell narrow, nearly pointed posteriorly, closed, transverse vein very faint between veins 6 and the common stem of 7 and 8; costal attains costa at about two-fifths from the base, vein 2 arises closely to the short stem of 3 and 4, 5 approximates to 4; 7 and 8 long stemmed, 7 to costa; 7–11 attain the costal margin at approximately equal distance. 1*b* distinctly furcate at base. Cilia less than width of wing, scale-dusted. Hind wings three-fourths as wide as fore wings, outer margin deeply emarginate, causing the wing to become bifid; costal margin straight for two-fifths its length, thence feebly emarginate to the apex; dorsal margin straight from the distinct anal angle to the apex of lower apical cusp. Cilia nearly twice the width of the wing. Neuration: costal running close to the costa and nearly reaching the extreme apex, cell open between veins 4 and 5, closed between 5 and 7, by the margin of the emargination, 2 arises before the middle, 3 and 4 remote, 5 independently from near the base and forms the costal margin of the lower cusp; the anterior median reaches the deepest part of the emargination and forms the dorsal margin of the upper branch of the fork. 1*b* furcate at base.

The characters thus represented are so anamalous as to find no counterpart anywhere among the *Tineid* genera, as far as my knowledge goes, nor elsewhere among the Lepidoptera except the Pterophoridæ, to which the genus under consideration, however, bears no relationship. Its rather robust body, general habitus and palpi would perhaps place it near *Scythris* Hb. (*Butalis* Tr.).

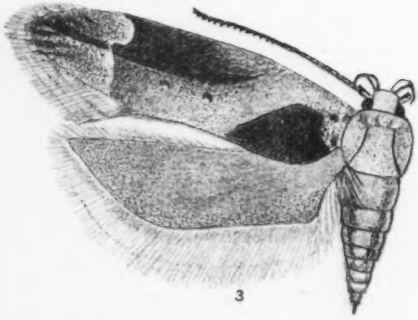
N. bifidella n. sp. (Plate I, fig. 2, 2*a*, 2*b*).—Palpi fuscous, annulus at end of second joint and extreme apex of third, white. Antennæ pale brown. Head and thorax greyish, tinged with brown. Fore wings pale brown, tinged with golden; a dark brown fascia at two-fifths, equidistant from the base at its costal and dorsal extremity, sharply defined externally and edged by a line of silvery white; toward the base it passes

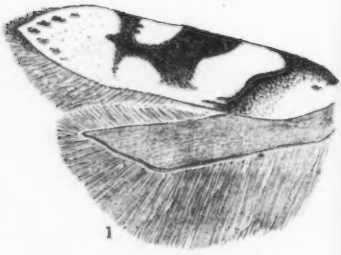
gradually into the ground color of the wing; extreme costa from base to fascia dark brown; a large costal patch of dark brown scales, beyond the middle, apical part and cilia densely dusted with nigro-fuscous scales, a subterminal line and extreme edge of latter, paler; before the darkly-dusted apical part of the wing is an indistinct, curved line of silvery scales, concave toward the base. Hind wings pale cinerous, cilia concolorous, pale stramineous toward the base. Abdomen pale fuscous. Anterior and middle legs dark fuscous, indistinctly spotted with pale, points of tarsi with a pale annulus; posterior legs paler. Length of fore wing 4.5 mm., 0.18 inch. Exp. 9.5 mm., 0.38 inch.

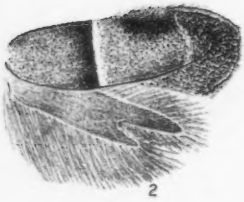
Hab.—Glenwood, Colo., August and September.

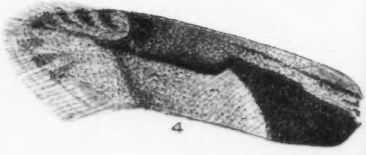
Varies somewhat in coloration of fore wings, ground color from a silvery grey to golden brown. In some specimens there is also a dorsal, less pronounced patch of brown scales, opposite the costal one. The pale line in apical part of wing is not evident in some specimens.

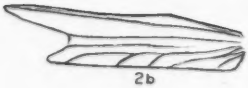
Pseudochelaria walsinghami n. sp. (Plate I, fig. 3*a*, 3*b*).—Palpi ashen grey, long, recurved, brush of second joint grooved, third joint longer than the second, pointed; outer side of first joint and base of second dark fuscous, brush dusted with fuscous, third joint with broad annulus above the base, rest dusted with fuscous scales. Antennæ slender, dark brown above, faintly annulate with pale grey, paler on the underside, finely denticulate toward the apex. Head grey; thorax, abdomen and anterior wings ashen grey, with feeble purplish reflections; a dark brown triangular spot on the posterior end of the thorax. Anterior wings marked with a dark, rich brown, as follows: basal space limited externally by a sharply-defined oblique line, twice as far removed from the base at the dorsal than at the costal margin, but not including the latter and a narrow space of the adjacent surface; a longitudinal stripe, beginning at two-fifths and extending through the middle of wing to the apex, rather sharply defined along its dorsal margin, but becoming more or less diffused with the dark shading in the costal half; a whitish fascia at the beginning of the apical cilia, interrupted by the longitudinal stripe and passing gradually into the dark shading of the apical part of the wing; the costal part of the fascia is concave toward the apex, the dorsal part straight, and passes obliquely backward to the dorsal margin; apical part with dark lines radiating into the cilia. The median space is washed with brownish, having a slight golden reflection, becoming darker in the costal portion, and more so toward the apical fascia; in the dorsal half are two brown spots at two-fifths and three-fifths of wing respectively, the former surrounded by raised white scales. Cilia pale with two darker lines, basal line more distinct. Underside fuscous. Posterior wings pale fuscous, paler toward the base; cilia pale fuscous around the apex, a faint darker line at two-thirds, and another, still less distinct, subterminal one.

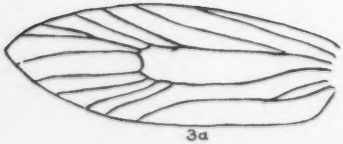


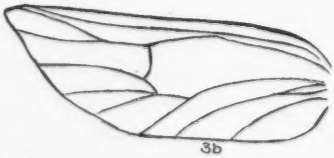












NEW MICRO-LEPIDOPTERA (Dietz).

Underside fuscous toward the apex. Underside of body and legs pale ochreous, last ventral segment more or less fuscous; femora and tibiæ banded with fuscous, tarsi annulate with the same. Posterior tibiæ with stiff appressed hair on the upper side. Length of anterior wing 7.5 mm.; exp. 17.0 mm., 0.68 inch.

Hab.—Hazleton, Pa.

Larva pale green, with isolated hairs, lives under a white web on the under side of the leaflets, and also along the petioles of *Sumach* (*Rhus typhosa*), where it may be found from the latter part of August and during September. Pupa brown. The imago appears the latter part of May and early part of June the following year.

It gives me pleasure to dedicate this species to Lord Walsingham, who established the above genus and the type of which (*E. pennsylvanica* Wlsm.) is in my collection. The latter species differs from the above-described one in the wing markings, as may readily be seen by a comparison of the figures. It was taken at electric light. Larva not known. Plate I, fig. 4.

EXPLANATION OF PLATE I.

Fig. 1.—Anterior and posterior wing of *Eucordylea atripictella*. 1*a*, lateral view of head and labial palpus of same.

Fig. 2.—Anterior and posterior wing of *Nealyda bifidella*. 2*a*, neuration of anterior wing; 2*b*, neuration of posterior wing of same.

Fig. 3.—*Pseudochelaria walsinghami*. 3*a*, neuration of anterior wing; 3*b*, neuration of posterior wing of same.

Fig. 4.—Anterior wing of *Pseudochelaria pennsylvanica* Wlsm.

Notes on the Species of Crabro Found in the State of Washington.

By TREVOR KINCAID, University of Washington.

Thanks to the excellent monograph of the Crabroninæ, published by Mr. William J. Fox, of the Academy of Natural Sciences of Philadelphia, it is possible for the American student of this group to readily determine such forms as he may discover.

During the last few years the writer has procured a considerable number of representatives of the genus *Crabro* from various parts of the State of Washington, and desires to place on

record such notes and data as may seem of interest to hymenopterists.

Mr. Fox, in his monograph, indicates twenty species of *Crabro* as occurring within the limits of this State. The following list includes twenty-eight species, the additional number being due to the extension of the range of six species to this region, and two species are described as new.

In their flower-visiting habits the members of the genus *Crabro* seem to have a preference for the blossoms of the Umbelliferæ. Most of the specimens recorded from Olympia were taken upon the flowers of an umbelliferous plant growing in an open meadow along the Deschutes River. At Seattle a number of specimens were taken during the Summer upon the flowers of cultivated parsnips, and in the Fall upon those of *Carum gairdneri* and *Angelica genuflexa*. A few specimens occurred at plants of other families, such as *Anaphalis margaritacea*, *Achillea millefolium*, etc. A series taken at Corvallis, Oregon, were, with few exceptions, found upon the flowers of *Heracleum lanatum*.

The localities mentioned in the following notes are all within the Puget Sound basin, except Pasco, Wawawai, Almota and the Blue Mountains, which are in Eastern Washington. Hence the former are in the Transition zone, while the latter are in the Upper Austral zone, as indicated by Dr. Merriam in his paper on the faunal areas of the United States.

In the preparation of this paper the writer wishes to acknowledge the assistance of Mr. Fox in determining some of the more difficult species.

Crabro producticollis Pack.

Ranges to New York and Texas.

Olympia, Wash., 3 ♀ ♀ June 23–26, 1897. Seattle, Wash., 1 ♂ at flowers of parsnip, June 10, 1897; 1 ♀ collection of Professor O. B. Johnson. Whidby Island, Wash., 3 ♂ ♂ and 3 ♀ ♀, collected by Mr. N. L. Gardner.

Crabro bellus Cress.

Ranges to Colorado, Nevada and Oregon.

Olympia, Wash., 1 ♀ June 3, 1895, 1 ♂ June 25, 1897. Corvallis, Oregon, 1 ♂ on *Heracleum lanatum*, June 5, 1898.

Crabro montanus Cress.

Ranges to New York.

Olympia, Wash., 25 ♀ ♀ and 24 ♂ ♂ June 5 to July 4, 1895–97, on Umbelliferæ. Seattle, Wash., 17 ♂ ♂, May 15 to June 15, 1897–98; 2 ♀ ♀ July 8, 1898, on *Achillea*; 1 ♀ June 10, 1897, on parsnip; 5 ♀ ♀ August 20, 1898, on *Carum gairdneri*; 3 ♀ ♀ August 25, 1898, on *Angelica genuflexa*. Whidby Island, Wash., 3 ♂ ♂ collected by Mr. N. L. Gardner. Chehalis, Wash., 1 ♀ June, 1897, collected by Mr. W. R. Coffman.

Crabro parvulus Pack.

Ranges to New Hampshire and Oregon.

Olympia, Wash., 1 ♀ September 3, 1894; 3 ♂ ♂ June 28 to July 3, 1897. Seattle, Wash., 6 ♀ ♀ May 21 to July 9, 1897–98; 1 ♂ July 8, 1898, on *Achillea*; 1 ♀ and 1 ♂ August 20, 1898, on *Carum gairdneri*.

Crabro gracilissimus Pack.

Recorded from Dakota and California.

Olympia, Wash., 46 ♂ ♂ May 13 to July 2, 1894–97; 10 ♀ ♀ June 12 to October 3, 1894–96. Seattle, Wash., 3 ♂ ♂ June 10, 1897, on parsnip, 1 ♂ May 18, 1897; 3 ♀ ♀ and 3 ♂ ♂ Aug. 20 to 22, 1898, on *Carum gairdneri*. Whidby Island, Wash., ♂ collected by Mr. N. L. Gardner; 2 ♂ ♂ and 1 ♀ August 6, 1898. Blue Mountains, Wash., 1 ♂ July 15, 1896, collected by Prof. C. V. Piper. Cornvallis, Oregon, 1 ♀ June 12, 1898, on *Heracleum lanatum*.

Crabro nigrifrons Cress.

Ranges to New York, Nevada, California.

Olympia, Wash., 5 ♂ ♂ June 13 to June 24, 1894–96; 1 ♀ June 29, 1896. Seattle, Wash., 2 ♀ ♀, June 9, 1897. Whidby Island, Wash., 1 ♂ collected by Mr. N. L. Gardner, July 30, 1898.

Crabro sexmaculatus Say.

Ranges to Delaware and California.

Olympia, Wash., 10 ♀ ♀, June 5 to June 26, 1895–96; 23 ♂ ♂, June 4 to June 26, 1895–6. Seattle, Wash, 3 ♂ ♂, June 10 to July 1, 1898, on parsnip; 1 ♀ August 24, '99, on *Anaphalis*.

Whidby Island, Wash., 1 ♀ and 1 ♂, collected by Mr. N. L. Gardner. Chehalis, Wash., 3 ♀ ♀ and 3 ♂ ♂ collected by Mr. W. R. Coffman. Portland, Oregon, 1 ♀ collected by Miss Emily Cauthorn. Corvallis, Oregon, 27 ♀ ♀ and 44 ♂ ♂ June 4 to June 22, 1898, on *Heracleum lanatum*.

Crabro foxii n. sp.

♂—Antennæ with the fourth joint emarginate beneath, first joint but little longer than the second; head with distinct punctures, closest anteriorly; space between hind ocelli slightly less than that between them and the nearest eye margin; pronotum crested, lateral tooth small but distinct; dorsulum rather coarsely striato-punctate; mesopleuræ coarsely striato-punctate; middle segment above striato-rugose, separated from the posterior face by a series of large foveæ; posterior face transversely and less strongly rugose than the upper face, bounded outwardly by a foveolated furrow; longitudinal furrow broad and deep, divided into foveæ above; sides coarsely striated; abdomen finely punctured; first joint of medial tarsi scarcely as long as the two following joints combined, first and second joints moderately produced within. Black; two spots on pronotum, spots on metanotum, spot at tips of fore and medial femora, all tibiæ outwardly, basal joints of tarsi to a variable extent, an elongated spot on each side of dorsal abdominal segment 2-6, yellow; the spots on segment 2 largest, those on 6 small and almost forming a band; wings subhyaline, nervures and stigma black. Length 7.0 mm.

Olympia, Wash., 2 ♂ ♂, June 17, 1897; 1 ♂ June 26, 1896.

This species belongs to Mr. Fox's group *sexmaculatus*, and is closely allied to *C. trifasciatus* Say, from which it differs principally in the length of the first joint of medial tarsus. In *C. trifasciatus* this joint is as long as the three following joints combined, whereas in *C. foxii* it is scarcely as long as the two succeeding joints, and is dilated somewhat, beyond middle. Named in honor of Mr. William J. Fox, of the Academy of Natural Sciences of Philadelphia.

Crabro spiniferus Fox.

Ranges to California, Nevada and Arizona.

Pasco, Wash., 1 ♂ May 25, 1896. Corvallis, Oregon, 16 ♂ ♂ June 2 to June 23, 1898; 2 ♀ ♀ June 22 and 23, 1898.

Crabro packardi Cress.

Ranges to Nevada and Oregon.

Seattle, Wash., 1 ♀, collection of Prof. O. B. Johnson.

Crabro chrysarginus St. F. & B.

Ranges to Canada and Florida.

Olympia, Wash., 1 June 4, 1896. Seattle, Wash., 1 ♂ at *Angelica genuflexa*, August 20, 1898; 1 ♂ at *Carum gairdneri*, August 23, 1898.

Crabro dilectus Cress.

Ranges to Montana and California.

Almota, Wash., 1 ♂ Prof. C. V. Piper; Pasco, Wash., 1 ♂; Wawai, Wash., 1 ♀, collection of Prof. O. B. Johnson.

Crabro singularis Sm.

Ranges to Maine and Louisiana.

Olympia, Wash., 2 ♀ ♀ October 3, 1894. Whidby Island, Wash., 2 ♂ ♂, collected by Mr. H. L. Gardner.

Crabro pleuralis Fox.

Vancouver, Wash.; Seattle, Wash., collection of Prof. O. B. Johnson.

Crabro argus Pack.

Ranges to New York.

Olympia, Wash., 53 ♂ ♂ June 10 to July 3, 1896–97–98. Seattle, Wash., 11 ♂ ♂ July 26, 1898. This species always occurs hovering about the branches of the alder *Alnus rubra*.

Crabro medius Fox.

Ranges to Nevada.

Whidby Island, Wash., 1 ♂, collected by Mr. N. L. Gardner.

Crabro latipes Sm.

Ranges to Nova Scotia, Montana, California and Arizona.

Olympia, Wash., 2 ♂ ♂ June 2, 1894. Chehalis, Wash., 1 ♂ May 25, 1898, collected by Mr. W. R. Coffman. Pasco, Wash., 1 ♂ May 25, 1896. Whidby Island, Wash., 1 ♂ June 30, 1898, collected by Mr. Eldred Jenne.

Crabro vicinus Cress.

Ranges to Colorado, Arizona and California.

Olympia, Wash., 1 ♀ June 13, 1893. Seattle, Wash., 1 ♀, collection of Prof. O. B. Johnson. Corvallis, Oregon, 3 ♀ ♀ June 3 to June 16, 1898, on *Heracleum lanatum*. Newport, Oregon, 1 ♀ June 10, 1898.

Crabro cingulatus Pack.

Ranges to Texas and Illinois.

Olympia, Wash., 5 ♀ ♀ June 14 to July 1, 1896, flying about clumps of *Lysichiton kamtschatense*. These represent a variety, lacking the scutellar spots.

Crabro advenus Sm.

Recorded from Washington by Mr. Fox.

Crabro confertus Fox.

Ranges to Colorado.

Olympia, Wash., 1 ♀ June 14, 1895. Corvallis, Oregon, 10 ♂ ♂ June 10 to June 23, 1898.

Crabro pinguis Fox.

Recorded from Washington by Mr. Fox.

Crabro maculiclypeus Fox *var.*

Ranges to Colorado, Utah, New Jersey.

Olympia, Wash., 1 ♂ June 23, 1897. Seattle, Wash., 1 ♀ June 10, 1897.

Crabro scutellatus Say, *var.* (?)

Ranges to Pennsylvania and Colorado.

Seattle, Wash., 1 ♀ July 5, 1898.

Crabro angelicus n. sp.

♀—Anterior margin of clypeus dentate laterally and with a median truncated projection; head finely and distinctly punctured; impressed lines from frontal depression to fore ocellus and from lateral ocelli to eyes, distinct; first joint of flagellum one-fourth longer than the second; ocelli in an equilaterial triangle; space between hind ocelli much less than between them and nearest eye margin; pronotum with a rounded crest, subangular laterally; dorsulum finely punctured, mesopleuræ less distinctiy so, the episternal suture curved; middle segment with the enclosed area of the upper face bounded posteriorly by a semi-circular line of foveæ divided by the longitudinal finely foveolated furrow into two shining prominences, between which at the base there is a triangular striated area; posterior face finely roughened, lateral ridges distinct below, becoming obsolete above; sides shining; abdomen as long as head and thorax combined, shining, microscopically punctured, the last dorsal segment more strongly so; pygidium broad, flat, distinctly punctured. Black; large spots on each side of clypeus, line outwardly on scape, small spots on pronotum, tubercles, line on metanotum, fore and

medial tibiæ outwardly, base of hind tibiæ, fore and medial tarsi, white; spot at tip of fore femora, lateral spots on fore tibiæ, reddish; wings subhyaline; nervures and stigma brown. Length 6.5. mm.

Seattle, Wash., July 16, 1898, 2 ♀ ♀ taken at flowers of *Angelica genuflexa*. This species belongs in Mr. Fox's group *minimus*, and is closely allied to *C. scutellatus*.

Crabro tarsalis Fox.

Recorded from New York by Mr. Fox.

Seattle, Wash., 1 ♂ July 26, 1898.

Crabro ater Cress.

Olympia, Wash., 3 ♂ ♂ June 20, 1897, June 27, 1898; 1 ♀ June 27, 1897.

Crabro pedicellatus Pack.

Ranges to New York and Michigan.

Olympia, Wash., 2 ♂ ♂ June 23, 1897.

Zoology as Taught at the Massachusetts Agricultural College, with Reference to Entomology.

By Prof. C. H. FERNALD, Ph. D.

Physiology.—This course is offered to the sophomore class during the Winter term, and extends throughout the entire eleven weeks, four hours a week. It is taught by means of a text-book, Martin's "The Human Body" (advanced course), supplemented by lectures and demonstrations on the skeleton and models. The aim is to give, as thoroughly as may be, a knowledge of the anatomy of the human system, the physiology of its various parts, a general idea of hygiene, and to urge upon the student the practice of its teaching. The course presupposes an elementary knowledge of the subject, so that the result, aside from its own worth, forms a valuable aid to the study of zoology which follows.

Zoology.—Zoology is a required subject, junior year, and may be divided into three parts—a laboratory course in comparative anatomy, a lecture course in general zoology, and a course in elementary entomology. During the fall term eight hours a week, for sixteen weeks, are spent mainly in the laboratory, where a series of typical forms, ranging from the amoeba and

other microscopic animals, through the earthworm, clam, squid, lobster, star-fish, sea-urchin, shark, frog and pigeon to the cat, are dissected, studied and drawn. Previous to the dissection of any form a short lecture is given, which, supplemented by a full list of laboratory guides and text-books, gives the student a sufficient knowledge to enable him intelligently to study the creature before him. Each man provides himself with a set of dissecting instruments and note books, but all other apparatus and books are owned by the laboratory. During the Winter term a series of thirty lectures is given, covering the entire subject of zoology, except that portion having reference to the insects, which, because of their importance, are treated as a separate science. The aim here is to supplement and render orderly the knowledge already gained through the medium of the microscope and scalpel, and the lectures are abundantly illustrated by the very complete museum belonging to the department and containing over twelve thousand specimens. Collateral reading is encouraged, and occasional quizzes are given as a test of the student's knowledge from all sources.

Entomology.—A course of six hours a week is offered in entomology, during the Summer term, its aim being to give a general knowledge of insect anatomy and physiology and a systematic review of the entire group, taking as types, as far as possible, those forms of economic interest to man, and at the same time giving an idea of the life history of each species so taken, and the means of combating it. A knowledge of insecticides and insecticide machinery and their use is given. An interesting feature of the course is the collection which each student makes and arranges of the more common species which may be found on the college grounds and the nearby region. A very full museum collection serves as an aid to identification and arrangement.

Senior Entomology.—During the senior year such members of this class as elect advanced entomology take a course of lectures on the external and internal anatomy of insects and on the various methods by which injurious forms are destroyed or held in check. The laboratory work consists of a critical study

of the external and internal anatomy of members of the different groups, followed by the determination of insects of each group. In connection with this work a careful study of the literature is made, and familiarity with the analytical keys and the more important articles on injurious species is obtained. During the Spring term much of the time is spent in the field, where the student is taught how to look for and find injuries caused by insects, to recognize the species by the nature of these injuries, and how best to deal with each case, either by the use of insecticides or other methods. Finally each student is required to prepare a thesis on some insect or group of insects pertaining to the business in which he intends to engage. He is asked at the beginning of the year what occupation he intends to follow after graduation, and is then advised to prepare his thesis on those insects with which he will have most to deal in the business he has selected. In the preparation of this thesis the work is carried on in the most approved methods, so that he may obtain the most scientific and at the same time practical knowledge of the subject. In fact he is taught such methods of investigation that, if new insect pests appear on his crops, he will know how to proroperly investigate them and discover the best and cheapest methods for their destruction. If this thesis, when completed, contains information of public interest, whether of an economic character or otherwise, it is published, with whatever illustrations are necessary.

This course is primarily for the student of agriculture or horticulture, but, when taken in connection with botany and chemistry, is especially adapted to one wishing to fit himself as a teacher of science in our pubilc schools, or to one intending to study medicine, but in this case his laboratory work would be devoted mainly to histology.

Graduate Entomology.—This department is now prepared for and is receiving graduates, from this and other colleges, who wish to continue the study of entomology beyond what they were able in their undergraduate course. These advanced studies will fit them for positions in the experiment stations or as State entomologists, and also give them most excellent training as teachers in our high schools and colleges.

A three years' course leading to the degree of Doctor of Philosophy is in active operation, three subjects—Botany, Chemistry and Entomology, arranged as a major and two minors—being required. In those cases where entomology is chosen as the major subject the course consists of lectures and laboratory work, some of the topics treated being the following:

Morphology and Development of Insects—Embryology. Transformations. Histology. Phylogeny. Hermaphroditism. Hybrids. Parthenogenesis. Pædogenesis. Colors; chemistry of insect colors. Mimicry. Warning coloration. Luminosity. Deformities of insects. Insect variation. Duration of life.

Œcology of Insects.—Life histories of insects. Instincts of insects. Insect architecture. Dimorphisms. Polymorphisms. Fertilization of plants through the agency of insects. Insect products of value to man. Insects as disseminators of disease. Enemies of insects; vegetable and animal, including parasitism. Geographical distribution in the different faunal regions. Methods of distribution. Insect migrations. Geological history of insects.

Economic Entomology.—Principles. Insecticides. Apparatus. Special cases (borers, etc.). Photography of insects and their work. Methods of drawing for illustrations. Field work on insects. Insect legislation.

Systematic Entomology.—History of entomology, including the classification of various authors and the principles of classification. Laws governing nomenclature. Literature; how to find and use it. Indexing literature. Number of insects in collections and in existence (estimated). Lives of prominent entomologists. Methods of collecting, preparing, preserving and shipping insects. Important collection of insects of the world.

In connection with these topics corresponding laboratory work is given so far as possible, and in addition investigations on subjects not previously studied are made, and the results published in the form of graduate theses.

SILVER LAKE, UTAH.

By A. J. SNYDER.

And after the Fourth was over, especially that part of it described by the Doctor in December NEWS; when we had emerged from the mouth of the canon, removed the dust collected during a day's journey of not less than eighteen miles, during which even the Doctor had shown marvelous ability to "get over sage brush," and our friend Laurent had absolutely refused to travel farther for either flies or beetles; when Mrs. Browning had again provided refreshment for the hungry "bug-hunters," and the captures of the day had been discussed and recorded, we walked twelve of those long Salt Lake City blocks to call upon the owners of a cottage at Silver Lake and gain permission to camp on their premises and use the cottage during our stay in the mountains.

One other incident, however, inasmuch as it affords another illustration of the depravity of man, and is connected with City Creek Canon, must be related by the subject of the plot, who considers himself better able to relate the facts than the perpetrator of the deed. Papilios were abundant, and about every moist spot in the road they were collected in great numbers. Papilios, as everyone knows, may be decoyed by placing some of their kind in conspicuous places, where their brilliantly-colored wings will attract all passers. One of the party, let his name be anon, saw numerous fine butterflies about a small moist spot in the road, and, stealthily creeping upon them, slowly lowered his net for a stroke, but pausing to select only the perfect ones for capture, perceived that all were second-class specimens. At the same instant he decided not to make a stroke, for, beneath a convenient bush, he heard a suppressed chuckle, and at a glance saw the Doctor, in imminent danger of bursting his sides with laughter because his friend had attempted a still hunt and had almost made a "pot-shot" at his decoys.

Silver Lake, Utah, is a small Summer resort back in the mountains, thirty-three miles from Salt Lake City, and at the head of Big Cottonwood Canon. In the Winter this little

valley is literally filled with snow, and during the early part of July some of the lakes above Brighton's, as the only hotel is called, have ice upon their surfaces. All through the Summer, snow may be seen upon the high mountains surrounding Silver Lake, and up to the middle of July the snow banks cling to the margin of Twin Lakes and Mary's Lake, while the ice water from the surrounding snow constantly cools the waters of several lakes which are well stocked with speckled beauties. These are large enough to allure even the most ardent chaser of butterflies and cause him to drop a fly or worm into the clear depths, where the artful dodgers are plainly visible, and where they are likely to remain, spurning, at that season of the year, the most tempting bait.

Eight or more miles from the city the stage road enters the foot-hills, and the rest of the journey to Silver Lake is up hill. Most of the distance the road is close beside the foaming current known as the Big Cottonwood. About half way up a pause is made for lunch and to change horses at the Half Way House. The driver turns into a small yard and stops before a house. We alight and find that we are in a small glen enclosed on all sides by rocks which rise almost perpendicularly hundreds of feet. On the right still rushes our mountain stream and ahead there seems no opening wide enough for a wagon road, but it is there, and winds upward, now on this side, then on that, of the stream, but ever onward, with ever-changing and constantly more beautiful scenery.

Parnassius clodius flits through the glen while we rest and lights upon a dwarf flower; *Pieris pallida* hovers about the small irrigation ditch; *Pamphila comma* lights upon a leaf in the sunshine; *Thecla californica* is found in its usual resting place, upon the leaves of the choke cherry, and on the same plant are found the larvæ and eggs of *Papilio rutulus; Papilio daunus* sails haughtily by and *Pyrameis carye* haunts the bunch of nettles by the water. *Melitæa acastus* flits about the door yard and the omnipresent *Vanessa antiopa* darts at the intruder from his resting place on a convenient tree. A fresh *Argynnis leto* hesitates beside a thistle blossom, but seems to realize that a bounty is placed upon its scalp (the Doctor is constantly re-

minding us of the scalp-locks and insists that nature always places such locks upon the thoraxes of butterflies, especially of the *Pamphilas*) and *A. leto* disappears down the canon. As we rest and notice the butterfly visitors to the glen we also see the mountain tops in the distance and think of the treasures we have found in similar localities, until our Jehu cracks his whip, and once more we journey upward. The first time we cross the stream we see many Papilios, and among them several *Papilio indra*. To our great sorrow we cannot take time to pursue, for we are going into a strange camp, and hope to arrive before dark.

A fourth member had joined the party that morning, Mr. J. B. Short, of Salt Lake City, a gentleman whose locks had been silvered by the icy fingers of time, and who carries the scars and a bullet received in fighting for his country; a gentleman who, no matter how many years may have passed over his head, will always love life in the open air, and will always be the same generous, hospitable, open-hearted host, whom we learned to know and appreciate during the days spent at Silver Lake. It was largely due to his courtesy and to the hospitality of Mrs. Short and their family that our stay here was so pleasant and profitable.

A tent, with comfortable cots for the night; a cottage, with food, stove and the necessary cooking utensils; what more could anyone want than sunshine and time to study the numerous insects, plants and animals? Everywhere on the mountain sides and tops butterflies were abundant when the sun shone. The stream before our cottage and the lakes about us were well stocked with trout; the rocks on the mountains sheltered numerous marmots, gophers and conies; a pair of eagles dwelt on the peak back of camp, and when waiting for meals, or when the sun failed to shine, innumerable beetles beneath the rocks and pieces of bark longed for our attention. The white-crowned sparrow picked up the crumbs about our door and a woodpecker fed its noisy young within a stone's throw of our tents. Mt. Millicent rose before us, Mt. Majestic at our backs, Mt. Scott towered on the right, and from our little valley numerous paths led to ideal places of collecting.

A somewhat lengthy introduction, dear readers, I know; but the writer believes that in the hearts of many others is the same love of the beautiful, appreciation of natural and grand scenery, and sympathy with all children of nature, which make these outings so delightful to him, and he would share the inspiration which he receives from his brief visits to and studies in the Rockies.

Come, join the party of three, as, on Monday morning, with all the essentials for collecting and preserving insects, they begin the day's work. It is useless to begin collecting butterflies before nine o'clock in the morning, for you will find none moving. From ten to two is the best time, and every moment included in those hours should be improved. If a cloud covers the sun the collector may as well seek a sheltered place and rest, for every butterfly will have disappeared.

This morning the sun shines, and as our path up the mountain leads into more open territory we see butterflies flitting here and there. There goes a beautiful *Anthocharis julia*. Its captor must be both quick and sure. Here and there an *Eudamus nevada* rests in an open spot on the bare ground. A careful stroke, and a quick one, if you would catch *E. nevada*. A few *Lycænas* are resting on the white flowers, and as the brow of the first mountain is approached we find a large patch of *Mertensia;* and noiselessly traveling from flower to flower is a "buzzless bee," as we early nicknamed *Hemaris brucei*. This species is usually rare in the parts of Utah I have visited, but a few days later we found it abundant about the blue and yellow flowers on this mountain side, and learned that the way to capture it was to wait, as it came up the mountain, and then be sure to capture the specimen at the first stroke.

Among the rocks near the top we found the wily *Chionobas chryxus* abundant, and after capturing enough to learn how it is done, and to gain some skill in detecting these wonderful insect mimics, as they rested with closely-folded wings upon the rocks, we turned our attention to other species.

Thecla sheridani was abundant on this mountain side, and associated with it was *Thecla affinis*. Not a single *sheridani* was found during either of my previous trips, but here their

green undersides were beautifully blended with the vegetation upon which they usually rested, and they were at home. Even when resting on the small white flowers of which they were very fond they were not easily seen. On the wing no eye could follow them, but fortunately for the collectors they had a habit of always returning to some spot near the one from which they were frightened, and then were easily captured.

Argynnids were scarce and hard to capture, but a few *meadii*, *snyderi*, *platina* and *chitone* were taken near the peaks or at the tops of mountain ridges. On the highest point of each mountain, resting on the rocks, were always found a few specimens whose sole duty seemed to be to chase others away. Here one usually found *Pyrameis cardui*, *Pieris occidentalis*, a *Pamphila* or two, several *Chionobas chryxus*, an *Eudamus*, and perhaps an *Argynnis* or a *Melitæa*. Most of these specimens were not worth capture, but their actions were interesting. Each newcomer was sure to be attacked, regardless of size or color. It was enough that he should move while others rested. There would be a flash and a buzz, and the two specimens, darting back and forth at each other, would gradually rise in the air until they disappeared in the distance. In a moment one would return and light in its former place as though nothing had happened, but be just as ready to attack the next arrival.

At the edges of the snowbanks we usually found *Melaporphyria ononis* and *belladonna*.

These are but a few of the species taken any day on the mountains. One is always being surprised in the Rockies. Perhaps he takes a friend to a place where he found a rare species abundant a previous year, all the conditions are favorable, but not a specimen is to be found. Why? I don't know. Some species are in their homes abundant, but only found in small areas. One year a species fairly swarms and then is not seen for years. Then, again, when one has found a species at a certain place and time he may be able to find it at the same place and time every year. All these peculiarities of insect life are like the physicians *sure* remedy for disease. "Sometimes it cured and sometimes it didn't." After collecting to the top of the first mountain one usually finds a

ridge or "hog-back" leading to the next peak, and so it is easy to go on and on until the day is spent, and then there is the long journey home.

The comparing of specimens at the end of the day's trip is one of the many pleasures, and identifying species in the field is another. A certain savant, once upon a time, offered fifty cents for each specimen that he could not identify in the field. When he arrived home after the trip he wrote to a friend: "Field identification is worth almost nothing." In the last statement he was certainly correct.

After a few days amid such scenes as here described two of the party found it necessary to turn their steps homeward. As the stage started down the thirty-three mile trail one morning two of the party were aboard, and the writer bade them a sorrowful adieu as he turned his lonesome footsteps toward Scott's Peak, of which and other scenes, both old and new, more anon.

THE paragraph relating to my report of captures, published on page 348 of the January number of ENTOMOLOGICAL NEWS, just received, should read *Catocala badia* instead of *Oedemasia badia*. I reported also, at the same meeting, the capture of a number of larvæ of *Oedemasia concinna*, on the same food plant, viz., bayberry, in October; hence, possibly, the slight confusion of names. These larvæ, at the end of October, spun cocoons very similar in texture and appearance to that of *Hyperchiria io*, but almost transparent. I have twenty-one of these cocoons, and the larvæ can still be distinguished, lying dormant, and apparently awaiting the arrival of spring before pupating.—S. T. KEMP, Elizabeth, N. J.

IN the NEWS for June, 1899, page 189, among the Doings of Societies, is a short account of *Feralia jocosa*, setting forth some of its habits, which do not agree with what we have observed here. We take this species every year by beating from willow flowers, and during the evenings of May 8th and 9th, 1898, we took eight or ten specimens by shaking from small plum and cherry trees which were in full bloom, it being an unusually early spring. We also take them quite often flying in the evening. We do a good deal of collecting by taking a lantern and net, and walking slowly along the numerous wood roads near here, and netting everything, as far as possible, that comes within reach. In this way we get many good things, and *jocosa* as often as any other equally rare species. It eems to have a short season—only about fifteen days between our earliest and latest dates.—CHARLES F. GOODHUE, Webster, N. H.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., FEBRUARY, 1900.

OUR *former* printer made a blunder in regard to the January NEWS, in placing on the title-page Vol. X, No. 11, instead of Vol. XI, No. 1. The copies had all been mailed to subscribers, and we feared double references if we reprinted the number and started the pagination with page 1. We have decided to put a reprint of the first leaf of the January number in this number, and continue the same paging through this volume (Vol. XI).

WE have already spoken of what might be termed peripatetic entomology, or walking — nowadays riding — over the country in search of types, with a view of getting correct names by comparison of specimens. There have been so many persons afflicted with the *mihi* itch who have described slight geographical variations as species that it becomes necessary to see the identical specimens from which their descriptions were made. If entomologists would only wait until proper series of specimens were at hand, or until they become sufficiently versed to know the meaning of variations—whether specific or the contrary—much of this trouble could be avoided. Lately we have had a number of gentlemen visit us on the errand of type-seeing, and we have wondered whether the time would come when entomologists would only describe species that are specific enough in character to enable an identification to be made without a railroad ticket in one's pocket. Probably there will always be persons who will describe these geographical forms; and so long as this is done, peripatetic entomology will be necessary, as every hundred miles changes the facies of a species, and evolution makes any description or identification impossible unless one's specimens came from the very fence-corner where the types were found. It is true that individuals in the human species are given names, and also cats and dogs; but, unfortunately, the individuals in insects are so numerous that their identification—to us, at least—seems impossible.

DEPARTMENT OF ECONOMIC ENTOMOLOGY.

Edited by Prof. JOHN B. SMITH, Sc. D., New Brunswick, N. J.

Papers for this department are solicited. They should be sent to the editor, Prof. John B. Smith, Sc.D., New Brunswick, N. J.

The Association of Economic Entomologists.—Bulletin No. 20, new series, of the U. S. Department of Agriculture, Division of Entomology, contains the proceedings of the 11th annual meeting of this body, at Columbus, Ohio, August 18 and 19, 1899. It is a pamphlet of 112 pages, most of them well worth reading, and some of them worthy of careful study.

By all odds the most comprehensive and valuable paper is the presidential address by C. L. Marlatt, entitled "The Laisser-Faire Philosophy Applied to the Insect Problem." I do not often quarrel with a title, but I consider this a somewhat unfortunate one, since, from the start, it tends to lead to a misunderstanding of the address.

Mr. Marlatt considers the subject from much broader, more philosophic grounds than has been done before, and shows conclusively that against certain *natural* movements we are powerless, whether we enact State or national laws. His example is the San José or pernicious scale, and, after rehearsing something of the efforts made to stem the tide of this insect's spread, he asks: "Does anyone think for a moment, and at all seriously, that the San José Scale is to be exterminated, and that its dissemination is to be prevented, whatever may be the legislation, and whatever quarantine steps may be adopted or exterminative measures put in operation?"

No one who has had any real experience in field work, and has ever lifted himself above the narrow little horizon bounded by spraying machines, dusters, poisons or fumigating outfits, and has viewed the processes before him with any real understanding, can fail to agree with Mr. Marlatt's conclusions. The processes of nature are slow, but they are as inevitable and irresistible as our "*laws*" are futile in opposition.

Mr. Marlatt explains why insects introduced into a new environment are often so much more injurious than natives, or than the strangers themselves were in their native home, and he points out that all these are mere local conditions that have little effect upon the balance of nature in the long run.

Now here is a chance for a misunderstanding and for the suggestion that the economic entomologist is a useless incumbrance, for if matters even themselves up in the long run they might as well be left to themselves altogether. But Mr. Marlatt's essay does not authorize this view. While we cannot stop the natural spread of the pernicious scale, now that it has secured a foothold, there is no reason why we should not prevent

its *artificial* spread by means of nursery stock as much as possible, or why we should not kill it off on our fruit trees, at intervals, to prevent any serious damage to the crops. We can palliate, or we can often avoid injury by dodging, and the entomologist has an overly-great field to cover in this direction.

Personally, I am glad Mr. Marlatt has spoken, and as definitely as he did. It is an indication that the San José scale scare is about over, and that we can now estimate it at a little nearer its true value. We have had conventions, have had lurid speeches and papers, have had State laws galore and attempts at national legislation as well. The result is that we have our nursery stock shut out of all foreign countries, and have annoying and expensive restrictions upon our fruit trade in some others. The scale has, meanwhile, marched on unconcernedly; more fruit is raised now than ever before; the farmers, where it has been established longest, have lost their dread of it; and how much of all the *good* is to be credited to the laws and to the great outcry?

Mr. Marlatt's point of view is, it seems to me, the completely correct one.

Dr. Howard presented the results of experiments made by the Russian, Prof. I. Porchinski, who finds that the Tabanids may be greatly reduced in number by covering pools which they frequent with a film of kerosene. An interesting and perhaps generally unknown fact is that Tabanids are so much addicted to drink!

One of the new fields into which applied entomology has recently entered is brought to our attention by Dr. Howard's intensely interesting account of the present status of the Caprifig experiments in California. It marks another step forward in the really scientific consideration of the relation of insects and plants to each other, and that two such papers as those by Marlatt and Howard should have been presented at one meeting shows that the Division of Entomology at least, in Washington, has risen above the dull routine of ascertaining the actual percentage of scales killed by any particular application, and its influence for good will increase in proportion to the encouragement which is given to the broad study of the problem. Mr. Marlatt has pointed out, not originally, indeed, but pertinently, that there is such a thing as a balance of nature, and, as all our interference, by introducing plants and insects into new localities, tends to unsettle this balance to our disadvantage, our studies should be directed toward restoring, so far as in us lies, this condition of equilibrium.

And, by the by, referring to the matter of judging an insecticide by the percentage of the specimens killed, this has always had an absurd side to it, from my point of view. If I apply a material, like tobacco for instance, and, after a day or two, find that it has killed ninety per cent. of the plant lice, this does not prove that it is the fault of the tobacco that the others were not killed, but simply that the insecticide did not reach

those that escaped. I know that crude petroleum will kill pernicious scales whenever it is brought into direct contact with them, and if, a month after a tree has been sprayed, I find ten per cent. of living examples, it does not occur to me to blame the oil, but the man who put it on.

Lest it be not sufficiently considered, Messrs. Howard and Marlatt present another communication on the pernicious scale, this time reviewing the evidence as to its original home. The conclusion is that really we do not know anything at all about it, and this expresses my own opinion exactly.

Dr. E. P. Felt gave an account of his endeavor to establish a voluntary entomological service in New York, and, under some circumstances and in some directions, such a service will undoubtedly prove useful.

Mr. W. G. Johnson described the Emory fumigator, devised for applying the hydrocyanic acid gas to orchard trees, and it seems clear that on the smaller trees an apparatus such as that described can be very successfully used.

The value of such work is undoubted, but I sometimes wonder if it is really entomological. Has not the entomologist done all that pertains to his office when he has studied the life history of a species, has discovered and pointed out the weak point where it is most subject to attack, and has indicated the killing agents that should be used? The practical application of his suggestions really does not belong to his office at all. I am aware that this limitation of our work is not practical, but personally I never go into that branch more than is absolutely necessary.

Mr. F. M. Webster spoke on "Insectary and Office Methods," and the seeming necessity for such machinery as he describes reconciles me to my lack of both insectary and assistants. There is, incidentally, the other advantage, that no one can ever charge that your assistants really did all your work.

Mr. A. H. Kirkland presented arsenate of lead as "A Probable Remedy for the Cranberry Fire-worm," and I have little doubt it will prove effective, as will any other of the arsenites if applied properly and at the right time.

The chinchbug received attention from Mr. F. M. Webster, who described an interesting outbreak in northern Ohio. It indicates very forcibly the effect of the prevailing industry of a region upon the abundance of a particular species. Dairying is a leading feature of the region mentioned, and the consequent number of timothy meadows offers ideal conditions for the development of the brachypterous forms of the *Blissus*.

Mr. A. L. Quaintance presented notes on "Some Insects of the Year in Georgia," which cannot well be condensed. A rather interesting note, however, charges *Monocrepidius vespertinus* with being a scavenger in habits, feeding upon the excrement of cotton ball-worms. In New

Jersey it has been at times and locally troublesome on beans, of which it has undoubtedly eaten the foilage, but none of the elaterids known to me feed very much at the worst.

The attempted use of poisoned bran against *Allorhina nitida* failed as, theoretically, it ought to, for the small mouth parts of these beetles, with the weak, compound mandibles, are not well adapted to mastication.

Dr. E. P. Felt presented "Notes of the Year for New York." The forest tent caterpillar seems to have found the season much to its liking in that and indeed some of the New England States, and widespread injury has been caused to sugar bush as well as to orchard and shade trees in the infested region. The elm leaf beetle is spreading and very injurious in its new localities. In this connection it is interesting to note that this is now the third successive season during which very little injury has been done in New Jersey, more, however, this year (1899) than during the two last preceding it.

It is decidedly interesting to note that the *Diabrotica 12-punctata* has spread far into northern New York and has reached Buffalo in its progress, which seems to become more rapid each year. Brood XIX of the periodical *Cicada* occurred in several counties in western New York.

Mr. W. G. Johnson presented "Miscellaneous Entomological Notes" on a variety of species of local economic importance.

Messsrs. Webster and Mally presented notes on the "Insects of the Year in Ohio," mentioning a great number of species. An interesting statement is: "At last we have found out how to kill the rose-chafer, *Macrodactylus subspinosus*. * * * One half pound of fish oil soap, dissolved in a gallon of water and sprayed upon them, will kill ninety-five per cent. of the adults, the females being especially susceptible, if the suds is sprayed directly upon them." This sounds suspicious, and will certainly not apply in New Jersey, where suds of double that strength have proved ineffective. The fact that females were the more susceptible recalls the results of one experiment with sludge-oil soap, where females were so generally killed that I examined closely and found that all were wornout specimens that had oviposited and were ready to die naturally.

Mr. Marlatt discussed "Temperature Control of Scale Insects," a point which was incidentally referred to by others, and formed the subject of another paper by W. M. Scott, of Georgia. It seems that, to the South especially, the low temperatures of the early part of 1899 were fatal to a variety of species, while others were unharmed. Further to the north the effect was less marked, and it is notable that the lowest recorded temperatures failed to affect the pernicious scale. Species that wintered in the egg stage suffered as much as those that were partly grown. "It will be seen that the cold of the winter in question was as efficient as an ordinary treatment with the best of our insecticides."

Mr. Marlatt also gave an account of *Aspidiotus ostreæformis*, a European species which has been introduced into the United States, and has

become established in some localities. I remember that when, in the early spring of 1898, I showed Dr. Ritsema Bos, the Dutch entomologist, some of our scaliest trees in New Jersey, he was not at all impressed, and said that he had seen trees in German orchards quite as badly covered by this newly-introduced pest. Now, let us pass laws excluding all European and Canadian fruit stocks.

Incidentally, Mr. Webster expressed himself on the effect of cold on the pernicious scales: "Doubtless the cold of winter kills the young, but the mature scales survive and continue breeding." My own experience is exactly opposite. Specimens that begin breeding in fall *never* survive the winter, and the young produced late in the season are also apt to succumb. The specimens that set in October and become dormant in the form of little round black scales are the forms that survive and resume breeding the June following.

Mr. E. H. Forbush spoke on the destruction of hairy caterpillars by birds, and gave a list of those that had been found feeding upon them in Massachusetts. Our good friend the English sparrow is very close to the end of the list, and I cannot but think the habit exceptional in this bird. At all events my experience with this species has been that it keeps off more effective birds than itself, and thus far counterbalances what little good it may actually do. Nevertheless, Mr. Forbush is right in urging more systematic field observation to help us to a real knowledge of bird habits.

Mr. Johnson spoke on "The destructive pea louse, a new and important economic species of the genus *Nectarophora*." This was an account of a most remarkable invasion by a species not even described, which extended along the Atlantic Coast region from Connecticut to North Carolina, but was, perhaps, more severe in the southern range of the species. At all events, the percentage of injury was not as great in New Jersey as Mr. Johnson made it in Maryland. Toward the end of the season Mr. Johnson found predatory forms in such quantities that the aphids were disappearing and a fungus developed in many specimens. Similar conditions developed in New Jersey a little later and the fungus was determined for me by Dr. Thaxter as the common *Entomophthora aphidis*.

I can scarcely agree with Mr. Johnson, however, when he says: "As to the future, candidly, I am of the opinion that it will be many a day before we will see a repetition of such destruction to the pea crop by *Nectarophora destructor*." Mr. Johnson spoke in August, and at that time I would have been inclined to agree with him. But since that time the field peas on the college farm have been ruined, precisely as they were in the fall of 1898, though the character of the season was exactly opposite. I have advised our growers for canneries to place no dependence on crops to mature after June 15, the date when, in New Jersey, this insect became destructive.

Mr. Johnson also described "The Stalk Worm, a new enemy to young tobacco," though new only on this food plant. The species itself, *Crambus caligniosellus*, is old enough and common enough on corn, as Mr. Johnson pointed out.

Mr. A. H. Kirkland spoke of "An improvement in the manufacture of Arsenate of Lead," whereby nitrate of lead is used in place of the acetate. The resulting product contains about five per cent. more arsenic than that made with the acetate, and the cost is somewhat less. Unfortunately no exact formula is given, except that which is to be inferred from the fact that it requires 880 pounds arsenate of soda, 2398 pounds nitrate of lead to make one ton arsenate of lead, as compared with 758 pounds arsenate of soda and 2593.8 pounds acetate of lead to produce the same quantity.

Mr. E. H. Forbush reported on the progress of "Recent Work Against the Gypsy Moth," from which it appears that, while much had been accomplished in reducing the numbers of the insect in the known infested districts, three new colonies in outside districts have been discovered.

Mr. A. T. Burgess reported on "A Destructive Tanbark Beetle," *Dinoderus substriatus*, which he found developing in great numbers in the stock of a tannery at Malden, Mass.

Finally, before adjournment, the association adopted a set of resolutions which, as a whole, are admirable, but from one part of which I wish to dissent emphatically. It states: "The association is also in full sympathy with judicious national and State legislation for the purpose of enacting and enforcing laws to prevent the importation of foreign insect pests, and controlling or exterminating such as have become already established in this country."

That this was the sentiment of the majority in attendance is probably true, and it is in the nature of a direct contradiction to the conclusions of the presidential address. The association consists of *all* the members, and Mr. Marlatt's dissent at least is clearly enough expressed. It is one of those perfunctory resolutions which will be used wherever legislation is attempted and to support whatever the party using it happens to consider "judicious." Is any legislation that imposes a burden upon commerce "judicious"? JOHN B. SMITH.

SITODREPA PANICEA LINN, LIVING IN AND FEEDING UPON ARGOL.—Recently Prof. F. L. Odenbach, S. J., Ignatius College, Cleveland, Ohio, has sent me specimens of this well nigh omnivorous beetle, which he finds burrowing in Argol. During fermentation the juices of the grape deposits tartaric acid ($C_4 H_6 O_6$) in the form of hydropotassic tartrate or bitartrate of potash, which, in commerce, is known as tartar or argol. As, in this case, the deposit was from red wine, the beetles were working in red tartar, many of the pieces of hard dry argol being almost honeycombed with burrows.—F. M. WEBSTER.

Entomological Literature.

COMPILED BY P. P. CALVERT.

Under the above head it is intended to mention papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South). Articles irrelevant to American entomology will not be noted. Contributions to the anatomy, physiology and embryology of insects, however, relating to American or exotic species, will be recorded. The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published; * denotes that the paper in question contains descriptions of North American forms. Titles of all articles in foreign languages are translated into English; usually such articles are written in the same language as the title of the journal containing them, but when such articles are in other languages than English, French, German or Italian, this fact is indicated in brackets.

3. The American Naturalist, Boston, Dec., 1899.—**4.** The Canadian Entomologist, London, Ont., Dec., '99.—**5.** Psyche, Cambridge, Mass., Jan., 1900.—**6.** Journal of the New York Entomological Society, Dec., '99.—**8.** The Entomologist's Monthly Magazine, London, Jan., 1900.—**10.** Nature, London, '99.—**11.** The Annals and Magazine of Natural History, London, Dec., '99.—**12.** Comptes Rendus. L'Academie des Sciences, Paris, '99.—**21.** The Entomologist's Record, London, Dec., 15, '99.—**37.** Le Naturaliste Canadien, Chicoutimi, Quebec, Dec., '99.—**41.** Entomologische Nachrichten, '99, No. 23, Berlin, Dec.—**46.** Tijdschrift voor Entomologie, xlii, 3, The Hague, Dec. 6, '99.—**74.** Naturwissenschaftliche Wochenschrift, Berlin, '99.—**79.** La Nature, Paris, '99.—**82.** Centralblatt für Bakteriologie, Jena, '99.—**84.** Inseckten Börse, Leipsic, '99.—**108.** The Agricultural Journal, Cape Town, '99.—**120.** Consular Reports, U. S. Dept. of State, lxi, No. 231, Washington, Dec., '99.—**121.** Archives des Sciences Physiques et Naturelles, civ, No. 11, Geneva, Nov. 15, '99.

The Insect World: a Monthly Magazine, Edited Y. Nawa, Gifu, Japan, and printed entirely in Japanese, completed the twelfth number of the third volume Dec. 15, '99; we wish our contemporary long life!

THE GENERAL SUBJECT.—Anon. Obituary of Rev. Vincent Clementi, **4.—Carret, A.** M. F. Guillebeau and his entomological works (concl.), L'Echange Revue Linnéenne, Lyon, Dec., '99—**Coupin, H.** Propriety in insects, **79,** Dec. 23.—**Distant, W.L.** Biological suggestions, mimicry (cont.). Zoologist, London, Dec., '99.—**Dury, C.** Random notes on natural history [Odonata, Lepidoptera, Diptera, Coleoptera], Journal, Cincinnati Society of Natural History, xix, 5, Jan. 4, 1900.—**Felt, E. P.** Collection, preservation and distribution of New York insects, Bulletin, New York State Museum, vi, 26, Albany, Apr., '99. Received Dec. 13.—**Hepden, A. S.** Entomological science in schools, **21.—Jänichen, R.** A new aberration to the third generation of *Lasiocampa populifolia* Esp. var *autumnalis* Jaen, **84,** Dec., 28.—**Keilhack, K.** On soil-forming activity of insects, **74,** Dec. 24.—**v.**

Linden, M. Edgar Krügers "On the development of tho wings of insects with especial reference to the wing-covers of beetles", Biologisches Centralblatt, Erlangen, Dec. 1, '99.—**de Meijere, J. C. H.** On a case of dimorphism in the two sexes of a new Cecidomyid (*Monardia* van der Wulp), 2 pls., **46.**—**Roy, S.** Entomological notes, **37.**—**Sharp, D.** Insecta, and **Brown, A. W.** Arachnida, Myriopoda and Prototracheata in: The Zoological Record, Volume the Thirty-fifth. Being Records of Zoological Literature relating chiefly to the year 1898. Edited (for the Zoological Society of London) by David Sharp, London, '99 — **Tutt, J. W.** Entomology as a subject of instruction in schools, **21.**—**Weed, C. M.,** and **Murtfeldt, M. E.** Stories of Insect Life, Second Series, Summer and Autumn. Boston, U. S. A. Ginn & Co. 1899. Pp. x, 72. 34 figs.

ECONOMIC ENTOMOLOGY.—Anon. The malarial expedition to West Africa, Science, New York, Jan. 5, '99.—**Barchet.** Silkworms in China, **120.**—**Beutelspacher, G.** Suppressing the San José scale in Canada, **120.**—**Clement, A. L.** Tobacco insects, **79,** Dec. 2.—**Däubler.** The Malaria Expedition to Sierra Leone, **82,** Dec. 23.—**Hauitsch, R.** Mosquitoes and malaria, **10,** Dec. 21.—**Hopkins, A. D.** Preliminary report on the insect enemies of the forests in the northwest: an account of the results gained from a reconnoissance trip made in the Spring and early Summer of 1899. Bulletin No. 21, new series, U. S. Dept. of Agriculture, Division of Entomology, Washington, '99.—**Lawrie, E.** The "Laveran body" in birds and the mosquito theory of malaria, New York Medical Journal, Dec. 30, '99 —**Lounsbury, C. P.** Grain bug, Codling moth, Bagrada bug, **108,** Nov. 9.—**Id.** The bont tick, *Amblyomma hèbræum* Kock., its life history and habits, figs., **108,** Nov. 23.—**Id.** Report of the Government Entomologist for the year 1898, 9 pls. Cape of Good Hope Dept. of Agriculture, Capetown, '99.—**Lowe, V. H.** The forest tent-caterpillar, figs., Bulletin No. 159, New York Agricultural Experiment Station, Geneva, N. Y., Oct., '99.—**Reh.** Indigenous orchid scale-insects, **74,** Dec. 17.—**C. B. S.** Insects as carriers of disease, **10,** Dec. 14.—**Zimmermann, A.** The combatting of animals injurious to cultivated plants by means of their natural enemies, **82,** Dec. 1, 5.

PROTOTRACHEATA.—Bouvier, E. L. Biological observations on *Peripatus capensis* Grube, **12,** Dec. 4.—**Id.** Now observations on the American Peripati, **12,** Dec. 11.

MYRIOPODA AND ARACHNIDA.—Fritsch, A. Myriopoda pars ii [and] Arachnoidea. Fauna der Gaskohle und der Kalksteine der Permformation Böhmens, Bd. iv, heft 2. Prag., '99. Pls. 145-154.—**Silvestri, F.** Contribution to the study of Chilian Chilopods, Revista Chilena de Historia Natural, Valparaiso, Oct. and Nov., '99.

ORTHOPTERA.—Edes, R. T. Relation of the chirping of the tree cricket (*Œcanthus niveus*) to temperature, **3.**—**Hancock, J. L.**

Synopsis of subfamilies and genera of North American Tettigidæ, **5.**—**Petrunkewitsch, A.** The digestive organs of *Periplaneta orientalis* and *Blatta germanica*, histological and physiological studies, 1 pl., Zoologische Jahrbücher, Abtheilung für Anatomie u. Ontogenie, xiii, 1, Jena Dec. 5, '99.—**Tümpel, R.** Die Geradflügler Mitteleuropas, Lieferung 6, Eisenach, Verlag von M. Wilckens. Pp. 137–157, Perlidæ, Psocidæ, pls. xviii–xx [Acrididæ, Locustidæ].

NEUROPTERA.—Calvert, P. P. A contribution to knowledge of the Odonata of Paraguay, Anales, Museo Nacional de Buenos Aires, vii, Nov. 17, '99.—**Currie, R. P.** New species of North American Myrmeleonidæ, v*, **4.**—**McLachlan, R.** Concerning *Teratopsocus maculipennis* Reuter, with notes on the brachypterous condition in females of Psocidæ, **8.**

HEMIPTERA.—Cholodkovsky, N. Aphidological communications, 1 pl., Zoologischer Anzeiger, Leipsic, Nov. 27, '99.—**Cockerell, T. D. A.** A coccid from the far north*, **4.**—**Id.** New records of Coccidæ, **6.**—**Distant, W. L.** Rhynchotal notes, iii: Heteroptera, Discocephalinæ and Pentatominæ (part.), **118.**—**Kirkaldy, W.** A new Hawaiian Fulgorid genus and species, **41.**—**Slater, F W.** The egg-carrying habit of *Zaitha*, **3.**—**Webster, F. M.** Distribution of broods xxii, v and viii of *Cicada septendecim* in Indiana, map. Proceedings Indiana Academy of Science for 1898. Extract, no paging or date!

COLEOPTERA.—Blackburn, T. Revision of the genus *Paropsis*, part v, Proceedings, Linnean Society of New South Wales, '99, pt. iii, Sidney, Dec. 9, '99.—**Bordas, L.** General considerations on the male reproductive organs of Coleoptera with compound and racemose testes, **12,** Dec. 26.—**Chagnon, G.** *Cychrus viduus* Dej. captured at Saint-Hilaire, P. Q., **37.**—**Fischer.** [Oviposition and cocoons of] *Hydrophilus piceus*, **121.**—**Horn, W.**—Description of a new species of *Cicindela* [from S. America], Annali, Museo Civico di Storia Naturale di Genova, (2) xix, '99.—**Jacobson, G.** The genus *Alurno* (Coleoptera, Chrysomelidæ) [in Latin], Annuaire, Musée Zoologique de l'Academie Imperiale des Sciences de St. Petersbourg, '99, No. 3.—**Mead, C. E.** *Collops bipunctatus* as an enemy of the Colorado potato beetle, **3.**—**Wickham, H. F.** On Coleoptera found with ants, fifth paper, **5.**

DIPTERA.—Coquillett, D. W. Notes and descriptions of Trypetidæ*, **6.**—**Hecht, E.** Biological and histological notes on the larva of a Dipter (*Microdon mutabilis* L.), 1 pl., Archives de Zoologie Experimentale et Generale, (3) vii, No. 3, Paris, '99.—**de Meijere, J. C. H.** See the General Subject.—**Webster, F. M.** Species of Diptera reared in Indiana during the years 1884 to 1890, Proceedings, Indiana Academy of Science for 1898. Extract, no paging or date!

LEPIDOPTERA.—Beutenmüller, W. Descriptions of and notes on some North American Lepidoptera*, **6.**—**Cappel, H. A. de V. T. N.** On the spine on the fore tibia in the genus *Agrotis*, 3 pls. [in

Dutch]. **46.—v. Caradja, A.** On some *Spilosoma* hybrids [transl. from "Iris", '98]. Entomologist, London, Dec. '99.—**Crampton, H. E.** An experimental study upon Lepidoptera, figs., 3 pls., Archiv für Entwicklungsmechanik, ix, 2 Leipsic, Dec. 12, '99.—**Dyar, H. G.** Life histories of North American Geometridæ, viii, ix, **5.—Id.** The life histories of the New York slug caterpillars (concl.), 3 pls., **6.—Id.** Description of the mature larva of *Acronycta connecta*, fig., **6.—Fyles, T. W.** Observations upon *Bombyx cunea*, Drury, etc., **4.—Gibson, A.** *Lepisesia ulalume* Strecker in British Columbia, **4.—Moffat, J. A.** Butterfly wing structure, 1 pl., **4.—Moore, F.** Lepidoptera Indica, pts. xl, xli. London, Lovell Reeve & Co., '99. Recd. Jan. 15, 1900 [Pp. 65–112 of vol. iv, pls. 309–324. Nymphalinæ, group Nymphalina.]—**Ottolengui, R.** A contribution to the discussion of *Spilosoma congrua*, **4.—Rippon, R. H. F.** Icones Ornithopterorum, a monograph of the Rhopalocerus genus Ornithoptera or bird-wing butterflies. Pt. 14. Published by the author, London. Recd. Jan. 15, '99.—**Smith, J. B.** New Noctuids and notes*, **6.—Soule, C. G.** The "cocoons" or "cases" of some burrowing caterpillars, **5.—Standfuss, M.** The dampening of the surface of the body which takes place in certain larvæ before pupation, **84,** Dec. 21.—**Stichel, H.** *Parnassius apollo bartholomæus* n. subsp. and monographic treatment of the named palæarctic forms of *apollo*, **84,** Dec. 7, 14.—**Tutt, J. W.**—Migration and dispersal of insects: Lepidoptera, **21.—Wilson-Barker, D.** Butterfly-shadows, **10,** Dec. 7.

HYMENOPTERA.—André, E. The mushroom-raising ants [12 pp.]. Extrait de la Société Grayloise d'Emulation (année 1899).—**Anglas, J.** On the histogenesis of the imaginal muscles of Hymenoptera, Comptes Rendus, Société de Biologie, Paris, Dec. 2, '99.—**Ashmead, W. H.** Classification of the entomophilous wasps, or the superfamily Sphegoidea, No. 7, conclusion, **4.—Cockerell, T. D. A.,** and **Porter, W.** Contributions from the New Mexico Biological Station, vii: Observations on bees with descriptions of new genera and species, **11.—Dunning, S. N.** Notes on *Philanthus*, **4.—Emery, C.**—Vegetarianism among ants, **121.—Hunter, S. J.** The honey-bee and its food-plants with special reference to alfalfa, figs. Bulletin of the Dept. of Entomology, University of Kansas, Lawrence, '99. Recd. Dec. 26, '99.—**Konow, F. W.** New Tenthredinidæ, **41.—Id.** New South American *Stromboceros* species (fam. Tenthredinidæ)*, Wiener Entomologische Zeitung, xviii, 10, Dec. 24, '99.—**Marshall, T. A.** Braconidæ, pp. 289–334, pls. xiii–xv, in 67e Fascicule (July 1, 1899) and **Andrá, Ernest.** Mutillidæ, pp. 1–64. pls. i–iii in 68e Fascicule (Oct. 1, 1899) of Species des Hyménoptères d'Europe et d'Algerie fondé par Edmond André et continué sous Ernest André. Paris, Vve Dubosclard, éditeur.—**Robertson, C.** On the classification of bees, **4.—Smith, W. W.** Large colonies of ants in New Zealand, **8.**

Doings of Societies.

At a business meeting of the American Entomological Society held December 28th, 1899, the following officers were elected to serve during the coming year: *President*, Philip P. Calvert, Ph.D.; *Vice-President*, H. W. Wenzel; *Treasurer*, E. T. Cresson; *Recording Secretary*, Henry Skinner, M.D.; *Corresponding Secretary*, W. J. Fox; *Curator*, Henry Skinner; *Librarian*, W. J. Fox; *Publication Committee*, E. T. Cresson, C. Few Seiss, B. H. Smith; *Executive Committee*, P. Laurent, C. Liebeck, H. W. Wenzel; *Finance Committee*, J. W. McAllister, C. S. Welles, C. C. Cresson. HENRY SKINNER, *Sec.*

At a meeting of the Entomological Section of the Academy of Natural Sciences of Philadelphia, held December 28th, 1899, the following were elected officers for the year 1900: *Director*, Philip Laurent; *Vice-Director*, H. W. Wenzel; *Treasurer*, E. T. Cresson; *Conservator*, Henry Skinner, M.D.; *Recorder*, Henry Skinner, M.D.; *Secretary*, W. J. Fox; *Publication Committee*, C. W. Johnson, J. H. Ridings.

Mr. J. C. Bradley was duly elected an Associate of the Section. HENRY SKINNER, M.D., *Recorder.*

At the December meeting of the Feldman Collecting Social, held, on the evening of the 20th, at the residence of Mr. H. W. Wenzel, 1523 S. 13th St. Ten persons were present.

Prof. J. B. Smith called attention to larvæ of a species of *Tineid* which had burrowed in a mass of casein, which is not a natural food for insects of that kind.

The habits of the bee-moth larvæ were dwelt on by Messrs. H. Wenzel and Smith.

Mr. H. W. Wenzel exhibited specimens of *Ichalia costata*, a very rare insect in this locality; two specimens were taken on December 3d and 10th respectively. The capture of *Cryptorhynchus fuscatus* from Clementon, N. J., on December 17th, and two specimens of *Mycetina perpulchra* from Newtown Square, Pa., were recorded, as was also the collecting of *Cychrus* on December 10th and 17th in New Jersey.

Dr. H. Skinner remarked on the occurrence of *Hemaris Brucei* in Wasatch Mountains, Utah; it was quite plentiful at high altitudes. Also specimens of *Anarta melanopa* from the same locality were shown.

Prof. Smith stated that he had found that in collecting in various canons in the southwest, each canon would have a peculiar fauna of its own. He therefore pointed out the advisability of labelling specimens with the exact locality in which they were found.

A vote of thanks was extended to Mr. Frank Haimbach for the elegant collation tendered the members at the November meeting. WILLIAM J. FOX, *Secretary.*